Crowe

Smart decisions. Lasting value.™

Office of the Inspector General's Risk Assessment of the U.S. Nuclear Regulatory Commission's Decommissioning Trust Fund Oversight and Related Activities (OIG-24-RA-01)

July 1, 2024

Submitted to:
U.S. Nuclear Regulatory Commission Office of the Inspector General

Submitted by:
Bert Nuehring, Partner, Crowe LLP
1455 Pennsylvania Ave NW, Suite 700
Washington, DC 20004
Direct: 630.706.2071
Bert.Nuehring@crowe.com

Table of Contents

Executive Summary

Objective and Scope

The U.S. Nuclear Regulatory Commission (NRC) Office of the Inspector General (OIG) contracted with Crowe LLP under contract/order number 31310023A0002 to conduct an identification and assessment of risks related to the oversight performed by the NRC on the decommissioning trust funds (DTF) used by licensees during the decommissioning of nuclear reactor sites. The project's scope was to conduct a qualitative and quantitative risk assessment of the areas identified in collaboration with the OIG and other stakeholders.

The focus of our review was on the decommissioning process and trust funds related to nuclear power reactor sites. As of September 5, 2023, the NRC had responsibility for twenty-three (23) power reactor sites that were either currently undergoing decommissioning or had permanently ceased operations.[1] Although not included in the scope of our review, decommissioning can also occur at the following type of sites:

- Complex materials sites
- Research and Test Reactor sites
- Uranium Recovery sites
- Fuel Cycle Facilities

The scope of our analysis was the risks associated with the DTF expenses and the specific areas for which the NRC OIG has oversight. For the risk assessment, we did not interview licensees, but future assessments may necessitate such interviews.

According to the NRC's "Summary of Staff Biennial Review and Findings of the 2023 Decommissioning Funding Status Reports from Operating and Decommissioning Power Reactor Licensees," the amounts accumulated in the DTFs for operating power reactors totaled approximately $67 billion and the current balances in the DTFs for power reactor licensees in decommissioning totaled approximately $11.7 billion as of December 31, 2022.[2] One of the goals of this assessment was for the NRC OIG to take a proactive approach to identifying areas where gaps may exist in the oversight of that approximately $78.7 billion and reduce the risk that the funds may be misused.

Work Performed

To begin our risk assessment, we met with the OIG management and staff to review the objectives of the engagement and gain an initial understanding of the decommissioning process. We conducted brainstorming sessions with OIG leadership and the individuals who previously worked on audits, evaluations, and investigations related to the decommissioning process. We also conducted open-source research on publicly

[1] https://www.nrc.gov/info-finder/decommissioning/power-reactor/index.html (last accessed June 28, 2024)
[2] https://www.nrc.gov/docs/ML23304A230.pdf

available documentation. Specifically, we reviewed the following:

- Publicly Available News Articles
- NRC Public Correspondence and other Communications[3]
- NRC OIG Semiannual Reports to Congress[4]
- Decommissioning Funding Status (DFS) Reports[5]
- Prior Audits Related to the Decommissioning Process[6]
- Nuclear Energy Agency's "Cost Benchmarking of Decommissioning" Report[7]
- Agencywide Documents Access and Management System (ADAMS) Publicly Available Information[8]
- Status of the Decommissioning Program Annual Reports[9]
- NRC Inspection Manual Chapter 1245[10]
- Standard Review Plan on Power Reactor Licensee Financial Qualifications and Decommissioning Funding Assurance (DFA) (NUREG-1577)[11]
- Reactor Decommissioning Financial Assurance Working Group Final Report[12]
- Vendor Quality Assurance Inspection Reports
- OIG Evaluation Reports

We also attended the Nuclear Energy Institute's 2024 conference on nuclear decommissioning, which included sessions where we learned how the industry (1) transitions from plant operations to decommissioning, (2) manages risks associated with radiological decontamination and facility dismantling, and, (3) navigates the complex tasks associated with license termination.

As a result of our interviews with OIG personnel, open-source research, discussions with industry personnel, and insights gained from the conference, we developed an initial register of the risks related to the decommissioning process and the use of the funds set aside to complete the decommissioning of nuclear facilities.

We conducted detailed interviews with NRC OIG personnel where we gained an understanding of the OIG's role in its oversight of the NRC regarding the decommissioning process. Upon completion of our interviews with NRC OIG personnel, we conducted interviews with personnel from the following departments at the NRC who had been identified as either subject matter experts or as having key roles regarding

[3] https://www.nrc.gov/waste/decommissioning/reg-guides-comm/comm.html
[4] https://nrcoig.oversight.gov/reports/semiannual-report-congress
[5] https://www.nrc.gov/waste/decommissioning/finan-assur/bi-decom-reports.html
[6] *See, e.g.*, https://nrcoig.oversight.gov/reports/audit/audit-nrcs-oversight-adequacy-decommissioning-trust-funds
[7] https://www.oecd-nea.org/upload/docs/application/pdf/2019-12/7460-cost-benchmark-decom.pdf
[8] https://www.nrc.gov/reading-rm/adams.html
[9] *See* https://www.nrc.gov/docs/ML2326/ML23262B436.pdf (for fiscal year 2023) and https://www.nrc.gov/waste/decommissioning/program-docs.html (for prior years)
[10] https://www.nrc.gov/docs/ML23129A847.pdf
[11] https://www.nrc.gov/reading-rm/doc-collections/nuregs/staff/sr1577/index.html
[12] https://adamswebsearch2.nrc.gov/webSearch2/main.jsp?AccessionNumber=ML20101H123

the decommissioning process and the use of the DTFs:

- Region I Inspectors
- Region III Inspectors
- The Office of Nuclear Material Safety and Safeguards (NMSS), Division of Decommissioning, Uranium Recovery, and Waste Programs (DUWP)
- NMSS, Division of Rulemaking, Environmental, and Financial Support (REFS), Financial Assessment Branch (FAB)

We met with each interviewee, discussed the risk register with them, and requested that the interviewee perform a rating assessment on each risk that had been identified. For more detail on the risk rating methodology and results, please see the Assessment Methodology Section.

In the interviews with NRC personnel, we gained an understanding of the standards applying to the decommissioning process, the documentation received from licensees, and the inspection procedures or reviews performed by the respective NRC personnel and divisions. We also discussed potential risks relating to the decommissioning process and use of the DTFs.

Overview

The FAB in NMSS receives and reviews summary financial reports on the status of the DTFs annually (for sites in decommissioning) and biennially (for nuclear reactors still in operation). For reactors in decommissioning, annual DFS reports are required to include, at a minimum, seven items specified in 10 Code of Federal Regulations (C.F.R.) 50.82(a)(8)(v):

(1) The amount spent on decommissioning in the previous calendar year as well as cumulatively.
(2) The remaining balance of any decommissioning funds.
(3) The amount of funds provided by any other financial assurance methods being relied upon.
(4) An estimate of the remaining cost to complete radiological decommissioning, which reflects the difference between actual and estimated costs for work performed during the previous year.
(5) The decommissioning criteria upon which the estimate is based.
(6) Any modifications to the current method of providing financial assurance since the last DFS report.
(7) Any material changes to trust agreements or financial assurance contracts.

If, for power reactors in decommissioning, the DFS report analysis reveals a projected shortfall in the amount of remaining funds to complete decommissioning, the licensee is required to include additional financial assurance to immediately cover the identified shortfall in accordance with 10 C.F.R. section 50.82(a)(8)(vi). Based upon our initial assessment and review of documentation, the risk that funds will not be available for the decommissioning of nuclear facilities is low. The key mission objectives are being met and the potential for shortfalls in available funding necessary to pay for safe and complete decommissioning of nuclear sites is mitigated.

We noted that the NRC's regions and headquarters staff utilize inspection procedures and requirements related to their oversight of licensee compliance with DTF requirements. However, the procedures do not include oversight or analysis of transactions at the detailed expenditure level. The regional inspectors are not financial subject matter experts or auditors. It is not the role or responsibility, as defined in the regulations and inspection procedures, of the inspectors to perform the level of detailed review that may be required to properly classify the risks associated with the use of the DTFs. Nonetheless, even though they did not have the adequate access, tools, training, or resources to conduct a detailed review of the expenditures for decommissioning activities, regional inspectors have noted four recent incidents of improper or misuse of the funds while performing their high-level review of financial information.

The misuse of funds, however material it may or may not be, is always a cause for concern and catches the public's eye. To reduce that reputational risk and increase the public's confidence in the NRC's oversight of the funds that have been set aside to ensure a safe and effective decommissioning of nuclear sites, additional oversight of the detailed expenditures from the DTFs is needed.

The results of our risk assessment identified 25 risk statements, which were then rated as to the *impact* that each risk might have on the NRC or other stakeholders, including the public, if that risk were to occur. The risk statements were also rated as to the *likelihood* that the risk would occur. The *impact* and *likelihood* that an event would occur were evaluated by OIG team members and were rated by the OIG Senior Leadership Team.

Additionally, we reached out to the personnel we interviewed at the NRC and requested their ratings for the risks identified. In total, we received twenty (20) risk rating survey responses from NRC, OIG, and Crowe personnel. The ratings were then aggregated and sorted into groupings of High, Elevated, Moderate, Low, or Insignificant. There were no risks aggregated and rated as High or Elevated. Nineteen (19) risks were rated as Moderate (2.5–3.5) and six (6) risks rated as Low (below 2.5). Appendix A to this report provides the risk ratings for each of the 25 risks.

We must emphasize that the description of risk observations identified **does not** constitute 'audit' findings or deficiencies as defined in audit standards; therefore, we are not providing any assurance regarding the assessments we present in this report. As discussed under the "Key Risks" section of this report, this type of risk assessment is based on the probability of "what could potentially happen" (i.e., action(s) that may adversely affect program management's ability to achieve its objectives). This type of assessment is intended for management consideration of actions necessary to mitigate risk exposures, including the implementation of risk-based due diligence activities as a best practice to augment the organization's existing controls.

We conducted our assessment in accordance with the American Institute of Certified Public Accountants (AICPA) Consulting Standards. This engagement did not constitute a financial audit, performance audit, review, or attestation engagement in accordance with standards established by the AICPA and/or Government Auditing Standards. Our report is intended to assess existing practices, policies, and procedures to help identify risk areas for the OIG for future audit or oversight planning. We have no obligation to

perform any services beyond those described in our report. If we were to perform additional services, other matters might come to our attention that may affect our analysis and related conclusions. This engagement was not planned or conducted in contemplation of reliance on any other party. Therefore, items of interest to a third party might not be specifically addressed or matters might exist that could be assessed differently by a third party.

Background

The NRC's mission is to license and regulate the Nation's civilian use of radioactive materials, to provide reasonable assurance of adequate protection of public health and safety, to promote the common defense and security, and to protect the environment. The NRC regulates commercial nuclear power plants and other uses of nuclear materials, such as in nuclear medicine, through licensing, inspection, and enforcement of its requirements. The NRC has three stated objectives for serving the public:[13]

1. **Ensure the safe and secure use of radioactive materials.**
    a. Provide quality licensing and oversight of nuclear facilities and radioactive materials.
    b. Ensure that regulatory requirements adequately support the safe and secure use of radioactive materials.
    c. Maintain emergency preparedness and response capabilities for NRC and NRC-licensed facilities.
2. **Continue to foster a healthy organization.**
    a. Foster an organizational culture in which the workforce is engaged, adaptable, and receptive to change and makes data driven and evidence-based decisions.
    b. Enable the workforce to carry out the agency's mission by leveraging modern technology, innovation, and knowledge management to support data-driven decisions in an evolving regulatory landscape.
    c. Attract, develop, and maintain a high-performing, diverse, engaged, and flexible workforce with the skills needed to carry out the NRC's mission now and in the future.
3. **Inspire stakeholder confidence in the NRC.**
    a. Engage stakeholders in NRC activities in an effective and transparent manner.
    b. Uphold an NRC decisionmaking process that is data driven and evidence based while ensuring information is available and accessible to interested stakeholders.

[13] https://www.performance.gov/agencies/nrc/#

Decommissioning Process

For nuclear power reactors, the decommissioning process begins when a licensee decides to permanently cease operations. When a licensee decides to cease operations permanently, the nuclear facility must be decommissioned by safely removing it from service and reducing residual radioactivity to a level that permits release of the property and termination of the operating license. The major steps that make up the reactor decommissioning process are: certification to the NRC of permanent cessation of operations and removal of fuel; submittal and implementation of the Post-Shutdown Decommissioning Activities Report (PSDAR); submittal of the license termination plan (LTP); implementation of the LTP; and, completion of decommissioning.

The NRC has rules governing nuclear power plant decommissioning, including rules requiring cleanup of radioactively contaminated plant systems and structures, as well as removal of the radioactive fuel. These requirements are designed to protect workers and the public during the entire decommissioning process and the public after the license is terminated. Licensees may choose from two decommissioning strategies: DECON and SAFSTOR. Under DECON (immediate dismantling), soon after the nuclear facility closes, equipment, structures, and portions of the facility containing radioactive contaminants are removed or decontaminated to a level that permits release of the property and termination of the NRC license. Under SAFSTOR, often considered "deferred dismantling," a nuclear facility is maintained and monitored in a condition that allows the radioactivity to decay; afterwards, the plant is dismantled, and the property decontaminated.[14]

A licensee may also combine the two strategies by dismantling and decontaminating some portions of the facility while leaving other parts in SAFSTOR. The decision may be based on factors besides radioactive decay, such as availability of waste disposal sites. There is no formal declaration of a strategy: A facility is said to be in DECON when active decommissioning work is underway. This status information is provided in the first PSDAR, as required by 10 C.F.R. 50.82(a)(4)(i).

Notification

When the licensee has decided to permanently cease operations, it is required to submit a written notification to the NRC. In addition, the licensee must provide written certification to the NRC once fuel has been permanently removed from the reactor vessel.

Post-Shutdown Decommissioning Activities Report (PSDAR)

Before or within two years after cessation of operations, the licensee must submit a PSDAR to the NRC and a copy to the affected State(s). The PSDAR must include:

(1) a description and schedule for the planned decommissioning activities;
(2) an estimate of the expected costs; and

[14] A third type of decommissioning strategy, ENTOMB, is not applicable to the facilities considered by this report.

(3) a discussion that provides the means for concluding that the environmental impacts associated with the decommissioning activities will be bounded by appropriate, previously issued environmental impact statements (EISs).

The NRC will notify the public of its receipt of the PSDAR through the *Federal Register* and make the PSDAR available for public comment. In addition, the NRC will hold a public meeting near the licensee's facility to discuss the PSDAR. Although the NRC does not approve the PSDAR, the licensee cannot perform any major decommissioning activities until 90 days after the NRC has received the PSDAR. After this period, the licensee can perform decommissioning activities as long as the activities do not:

- foreclose release of the site for unrestricted use;
- result in significant environmental impacts not previously reviewed; or
- jeopardize reasonable assurance that adequate funds will be available for decommissioning.

The NRC's regulation at 10 C.F.R. 50.59, "Changes, Tests, and Experiments," allows a reactor licensee to make certain changes to its facility without a license amendment. In taking actions permitted under 10 C.F.R. 50.59 after submittal of the PSDAR, the licensee must notify the NRC in writing before performing any decommissioning activity inconsistent with, or making any significant schedule change from, those actions and schedules in the PSDAR (10 C.F.R. 50.82(a)(7)).

The NRC staff will periodically inspect operations at the licensee's site to ensure that decommissioning activities are being conducted in accordance with all applicable regulations and commitments.

License Termination Plan (LTP)

Each power reactor licensee must apply to the NRC for termination of its license. An LTP must be submitted at least 2 years before the license termination date. The LTP must include the following:

- a site characterization;
- identification of remaining dismantlement activities;
- plans for site remediation;
- detailed plans for the final radiation survey;
- a description of the end use of the site, if restricted;
- an updated site-specific estimate of remaining decommissioning costs;
- a supplement to the environmental report describing any new information or significant environmental change associated with the licensee's proposed termination activities; and,
- identification of parts, if any, of the facility or site that were released for use before approval of the LTP.

In addition, the licensee must demonstrate that the applicable requirements of the License Termination Rule (LTR) will be met.

The NRC and the licensee will hold pre-submittal meetings to discuss the format and content of the LTP. These meetings are open to the public and intended to improve the efficiency of the LTP development and review process.

The NRC will also notify the public of its receipt of the LTP and make it available for public comment. In addition, the NRC will hold a public meeting in the vicinity of the licensee's facility to discuss the LTP and the LTP review process. The LTP technical review is guided by NUREG-1700, "Standard Review Plan for Evaluating Nuclear Power Reactor License Termination Plans." The LTP, if approved by the NRC, is captured as a license amendment.

Implementation of the LTP

The licensee or other responsible party must complete decommissioning in accordance with the approved LTP. The NRC staff will periodically inspect the decommissioning operations at the site to ensure compliance with the LTP. These inspections will normally include in-process and confirmatory radiological surveys.

Decommissioning must be completed within 60 years of the plant ceasing operations. The NRC will consider a completion date beyond 60 years only when a delayed decommissioning timetable may be necessary to protect public health and safety in accordance with NRC regulations.

Completion of Decommissioning

At the conclusion of decommissioning activities, the licensee will submit a final status survey report (FSSR) that documents the final radiological conditions of the site, and request that the NRC either: (1) terminate the 10 C.F.R. Part 50 license; or (2) if the licensee has an Independent Spent Fuel Storage Installation (ISFSI), reduce the 10 C.F.R. Part 50 license boundary to the footprint of the ISFSI. For decommissioning reactors with no ISFSI, or an ISFSI that is authorized via specific license under 10 C.F.R. Part 72, "Licensing Requirements for the Independent Storage of Spent Nuclear Fuel, High-Level Radioactive Waste, and Reactor-Related Greater than Class C Waste," completion of reactor decommissioning will result in the termination of the 10 C.F.R. Part 50 license. The NRC will approve the FSSR and the licensee's request if it determines that the licensee has met both of the following conditions:

- the remaining dismantlement has been performed in accordance with the approved LTP; and,
- the final radiation survey and associated documentation demonstrates that the facility and site are suitable for release in accordance with the LTR.[15]

[15] https://www.nrc.gov/waste/decommissioning/process.html

Decommissioning Trust Funds (DTFs)

Before a nuclear power plant begins operations, the licensee must establish or obtain a financial mechanism—such as a trust fund or a guarantee from its parent company—to ensure there will be sufficient money to pay for the eventual decommissioning of the facility. Each nuclear power plant licensee must report to the NRC every two years the status of its decommissioning funding for each reactor or share of a reactor that it owns. The report must estimate the minimum amount needed for decommissioning by using the formulas found in 10 C.F.R. 50.75(c).[16] Licensees may alternatively determine a site-specific funding estimate, provided that amount is greater than the generic decommissioning estimate. Although there are many factors that affect reactor decommissioning costs, as of October 2022, the NRC estimated that the costs generally range from $300 million to $400 million.[17]

Approximately 70 percent of licensees are authorized to accumulate decommissioning funds over the operating life of their plants. These owners—generally traditional, rate-regulated electric utilities or indirectly regulated generation companies—are not required today to have all the funds needed for decommissioning. The remaining licensees must provide financial assurance through other methods such as prepaid decommissioning funds and/or a surety method or guarantee. The NRC performs an independent analysis of each of these reports to determine whether licensees are providing reasonable assurance that funds will be available to complete radiological decommissioning of the reactor after the permanent cessation of operation.[18]

Regulations

The NRC's decommissioning regulations are found in 10 C.F.R. Chapter I, "Energy." Part 20, Subpart E, provides the main requirements for license termination, although other parts contain applicable requirements as well. Among the relevant parts for decommissioning and license termination are:

- Part 20, Standards for Protection Against Radiation
- Part 30, Rules of General Applicability to Domestic Licensing of Byproduct Material
- Part 40, Domestic Licensing of Source Material
- Part 50, Domestic Licensing of Production and Utilization Facilities
- Part 51, Environmental Protection Regulations for Domestic Licensing and Related Regulatory Functions
- Part 70, Domestic Licensing of Special Nuclear Material
- Part 72, Licensing Requirements for the Independent Storage of Spent Nuclear Fuel, High-Level Radioactive Waste, and Reactor-Related Greater than Class C Waste
- Part 73, Physical Protection of Plants and Materials

[16] https://www.nrc.gov/reading-rm/doc-collections/cfr/part050/part050-0075.html. The minimum amounts in these tables are in 1986 dollars and have not been updated since.
[17] https://www.nrc.gov/reading-rm/doc-collections/fact-sheets/decommissioning.html
[18] Ibid.

Consolidated Decommissioning Guidance (NUREG-1757)

In addition to the regulatory requirements, the NRC has issued consolidated decommissioning guidance in the form of NUREGs. The NRC consolidated and updated numerous decommissioning guidance documents into NUREG-1757, which consists of three volumes addressing the following topics:

(1) Decommissioning Process for Materials Licensees;

(2) Characterization, Survey, and Determination of Radiological Criteria; and,

(3) Financial Assurance, Recordkeeping, and Timeliness.

The three-volume NUREG-1757 replaced NUREG-1727 ("NMSS Decommissioning Standard Review Plan," issued September 2000) and NUREG/BR-0241 ("NMSS Handbook for Decommissioning Fuel Cycle and Materials Licensees," issued March 1997). NUREG-1757 is intended for use by NRC staff, licensees, and others.

Volume 1 of this NUREG series, entitled "*Consolidated Decommissioning Guidance: Decommissioning Process for Materials Licensees*," takes a risk-informed, performance-based approach to the information needed to support an application for decommissioning a materials license and compliance with the radiological criteria for license termination in 10 C.F.R. Part 20, Subpart E.[19] The approaches to license termination described in this guidance are intended to help identify the information (subject matter and level of detail) needed to terminate a license by considering the specific circumstances of the wide range of radioactive materials users licensed by the NRC. The NRC encourages licensees to use this guidance in preparing license amendment requests, and NRC staff uses this guidance in reviewing these amendment requests.

Volume 1 as a whole is only intended to be applicable to the decommissioning of materials facilities licensed under 10 C.F.R. Parts 30, 40, 70, and 72 and to the ancillary surface facilities that support radioactive waste disposal activities licensed under 10 C.F.R. Parts 60, 61, and 63. However, parts of this volume are applicable to reactor licensees, as described in the Foreword to Volume 1.

Volume 2 of the NUREG series is entitled "*Consolidated Decommissioning Guidance: Characterization, Survey, and Determination of Radiological Criteria*."[20] This volume provides guidance on compliance with the radiological criteria for the LTR in 10 C.F.R. Part 20, Subpart E. This guidance takes a risk-informed, performance-based approach to the demonstration of compliance. This guidance is intended to help identify the information (subject matter and level of detail) needed to terminate a license and considers the specific circumstances of the wide range of NRC licensees. The NRC encourages licensees to use this guidance in preparing decommissioning plans (DPs), LTPs, final status surveys, and other technical decommissioning reports for NRC submittal. The NRC itself also uses the guidance in reviewing these documents and related license amendment requests. Volume 2 applies to all licensees subject to the LTR (i.e., fuel cycle, fuel storage, materials, and reactor licensees). Volume 3 of this

[19] https://www.nrc.gov/reading-rm/doc-collections/nuregs/staff/sr1757/v1/index.html
[20] https://www.nrc.gov/reading-rm/doc-collections/nuregs/staff/sr1757/v2/index.html

NUREG series provides guidance on the technical aspects of compliance with requirements for timeliness in decommissioning of materials facilities, the requirements for financial assurance for decommissioning, and the recordkeeping requirements related to eventual decommissioning.[21] The NRC encourages licensees to use this guidance in preparing decommissioning plans, LTPs, final status surveys, and other technical decommissioning reports for submittal to the NRC. The NRC staff, in turn, uses this guidance in reviewing these documents and related license amendment requests. Volume 3 is intended to apply only to the decommissioning of materials facilities licensed under 10 C.F.R. Parts 30, 40, 70, and 72.

Inspection Procedure 71801

NRC inspectors are tasked with conducting inspections of nuclear reactors that are in active decommissioning in accordance with Inspection Procedure 71801, "Decommissioning Performance and Status Reviews at Permanently Shutdown Reactors." The inspection objectives include:

(1) To evaluate the status of decommissioning and verify whether the licensee is conducting decommissioning and maintenance activities in accordance with regulatory and license requirements.
(2) To maintain awareness of work activities to assess licensee control and conduct of decommissioning.
(3) To evaluate the licensee's decommissioning staffing, personnel qualifications, and training requirements, including that of the contracted workforce, to ensure that license requirements are met, as applicable to the current decommissioning status.
(4) To identify and document in an inspection report the status, progress, and changes that potentially impact decommissioning financial assurance, to supplement information for the FAB to support and ensure a thorough financial analysis review of the annual decommissioning trust funds reported by the licensee.

As such, the inspectors are only required to perform a high-level review of overall financial status and decommissioning activities. During the inspection, the inspector is expected to determine if any criteria described below exist, in which case the assigned Financial Analyst in the FAB may initiate a Financial Assurance Spot Check Assessment on an as-needed basis with the licensee. The Financial Assurance Spot Check Assessment is performed by the FAB to ensure there is reasonable assurance the decommissioning trust fund remains adequate to complete the decommissioning.[22]

The scope of this inspection element is to engage with the licensee on the overall financial status of decommissioning to determine whether further review is needed by the FAB. Under the inspection procedure, the inspector, and the project manager, as available, should discuss the following topics and questions with appropriate licensee personnel to determine if any of the triggers for a FAB spot check are met by asking, since the last inspection of cost control:

[21] https://www.nrc.gov/reading-rm/doc-collections/nuregs/staff/sr1757/v3/index.html
[22] IP 71801 at 7–9

(1) Has there been a significant change in the decommissioning strategy or approach? A significant change would include moving from DECON to SAFSTOR or a decision that would increase the cost or timing of cost of the decommissioning (for example shipment of all waste to a licensed radioactive disposal facility versus survey for reuse of soils and concrete debris).
(2) Has the scope of work changed significantly, such as the volume of soil remediation, or time for removal of major components doubling, or waste shipments increasing by over 20%?
(3) Have there been significant unexpected decommissioning expenditures, such as 25% of a major milestone?
(4) What, if any, quality assurance protocols for financial assurance tracking and reporting are used and when?
(5) Were there any significant unexpected delays, such as greater than 25% in accomplishing planned activities?
(6) Are there currently any financial challenges to complete decommissioning?
(7) Has there been any significant decline in the trust fund balance?
(8) Were there any 10 C.F.R. 50.82(a)(7) compliance issues (i.e. significant cost and schedule changes from the PSDAR) identified by the licensee?
(9) How is the accuracy of the financial assurance estimate determined?
(10) Are major activities identified as decommissioning items in the PSDAR or site-specific cost estimate?
(11) Were there any changes to the financial allocation control process?
(12) Do any of the answers to the above affect safety?[23]

The Inspectors use the Financial Assurance Spot Check Assessment Trigger Criteria below to identify circumstances which may warrant the initiation of a check. If there is indication that any of the following have occurred or might occur, the inspector should notify the Decommissioning Project Manager, who will enlist the support of the FAB to initiate a Financial Assurance Spot Check Assessment in accordance with the internal office instruction LIC-205, "Procedures for NRC's Independent Analysis of Decommissioning Funding Assurance for Operating Nuclear Power Reactors and Power Reactors in Decommissioning":[24]

(1) Documented fraudulent financial activities (any reported or suspected by the licensee);
(2) Bankruptcy (including any planned entry into bankruptcy);
(3) Any indication of a significant decline in the trust fund balance; and,
(4) A substantiated allegation in the area of financial assurance.[25]

The inspector should document whether any of the trigger points were met, and if so, whether that information has been communicated to the FAB. The inspector should also review and document the completion of the FAB's initial evaluation of the financial allocation control process.

[23] Ibid. at 8
[24] https://www.nrc.gov/docs/ML1707/ML17075A095.pdf
[25] IP 71801 at 9

Reactor Decommissioning Financial Assurance Working Group Final Report

In 2020, the NRC organized a working group to comprehensively evaluate whether the existing decommissioning financial assurance licensing and oversight process remained adequate with respect to how decommissioning is likely to be accomplished in the future. The working group also considered whether the NRC had the appropriate infrastructure to identify any potential challenges. The purpose of the inter-office working group was to leverage legal, licensing, and oversight expertise to evaluate the existing process.[26]

As detailed in the working group's report, the group determined that the decommissioning financial assurance requirements and their enforcement, such as the DFS submission and review process, were sufficient to validate adequate financial assurance resources for all reactors, including reactors in decommissioning and merchant plants and limited liability companies. However, the working group did identify areas where FAB processes could be better integrated with inspection components through:

(1) Clarifying oversight of DTF expenditures as part of reviews of annual decommissioning fund status reports;
(2) Periodic cost-baselining;
(3) Developing 30-day notification guidance;
(4) Revising inspection procedures; and,
(5) Developing a decommissioning reactor financial assurance spot check program.[27]

Organization of NRC Oversight of Decommissioning

The NRC regulates the decontamination and decommissioning of materials and fuel cycle facilities, power reactors, research and test reactors, and uranium recovery facilities. The agency terminates approximately 200 materials licenses each year. Most of these license terminations are routine, and the sites require little, if any, remediation to meet the NRC's unrestricted release criteria. However, the focus of the agency's comprehensive decommissioning program is on sites that would need to submit a DP, reclamation plan, or LTP to the NRC for approval.

The NRC seeks to ensure that NRC-licensed sites are decommissioned in a safe, timely, and effective manner so that they can be returned to beneficial use; the agency also seeks to ensure that stakeholders are informed and involved regarding the decommissioning process. Decommissioning activities include site-specific licensing activities that support a licensee's cleanup of power and non-power reactors, complex materials and fuel facility sites, and uranium recovery sites. Such licensing activities include DP, reclamation plan, and LTP reviews; financial assurance reviews; radiological survey reviews; and public outreach. Other programmatic activities include developing guidance for the termination of facilities subject to NRC authority, resolving policy issues associated with site decommissioning, ensuring that the decommissioning

[26] Reactor Decommissioning Financial Assurance Working Group Final Report at 1 (PDF p. 3)
[27] Ibid. at 7 (PDF p. 9).

program is efficient and effective, and ensuring the program has a process for continuous improvement.

NMSS is responsible for regulating activities related to the production of nuclear fuel used in commercial nuclear reactors; the storage, transportation and disposal of high-level radioactive waste and spent nuclear fuel; and the transportation of radioactive materials regulated under the Atomic Energy Act. NMSS seeks to ensure safety and security by implementing a regulatory program that covers licensing, inspection, assessment of licensee performance, events analysis, enforcement, and identification and resolution of generic issues. NMSS's regulatory activities relate to uranium recovery, conversion, and enrichment activities; fuel fabrication and development; transportation of nuclear materials, including certification of transport containers, and reactor spent fuel storage; and safe management and disposal of spent fuel and high-level radioactive waste. NMSS also interacts with the U.S. Department of Energy and international experts regarding the development, demonstration and deployment of technologies that recycle nuclear fuel.

Within NMSS, the Division of Rulemaking, Environmental, and Financial Support (REFS) provides project management and technical expertise for the agency's rulemaking, environmental, and financial assessment activities. The division consists of three Centers of Expertise (COE):

- The **Rulemaking COE** leads the development of the technical, financial, legal, and administrative rules the NRC issues to regulate operating and new commercial nuclear power reactors, advanced reactor technologies, non-power production and utilization facilities, and the use of nuclear materials. The Rulemaking COE also prepares regulatory analyses for rules and other regulatory decisions, and develops and implements policies and guidance for the NRC's rulemaking program. The NRC's Liaison Officer with the Office of the Federal Register is in the Rulemaking COE.
- The **Environmental COE** leads environmental reviews for the NRC's licensing actions as required by the National Environmental Policy Act, the Endangered Species Act, and the National Historic Preservation Act. The Environmental COE develops and issues Environmental Impact Statements and Environmental Assessments, and coordinates these activities with other Federal, State, Local, and Tribal agencies. The Environmental COE monitors licensee adherence to endangered species take limits and consults with other Federal agencies on endangered species and essential fish habitats. The REFS Director serves as the NRC's Chief Environmental Review and Permitting Officer and the Federal Preservation Officer.
- The **Financial COE** leads financial assurance reviews for NRC licensing actions and ensures licensee compliance with decommissioning funding assurance requirements. The Financial COE helps prepare safety evaluations for new-reactor applicants and for actions associated with license transfers and exemption requests in which financial qualifications and decommissioning funding assurance requirements for reactor licensees are assessed. The Financial COE monitors compliance with power reactor financial protection requirements

in the form of insurance and indemnity coverage, and evaluation of foreign ownership, control, or domination concerns for potential new licensees. The Financial COE seeks to ensure that materials and ISFSI licensees meet decommissioning funding assurance requirements.

NMSS and NRC Regions I, III, and IV share responsibility for decommissioning program activities. Other NRC Offices, including the Office of Nuclear Reactor Regulation (NRR), have supporting roles. Within NMSS, DUWP has responsibility for regulating the decontamination and decommissioning of power reactors once the reactors have reached regulatory and safety milestones that ensure they more closely represent a materials facility temporarily storing and processing radioactive waste than a commercial power reactor. DUWP also has responsibility for regulating decommissioning activities involving research and test reactors, complex materials and fuel cycle facilities, and uranium recovery facilities.

The Regions have the lead in the inspection of decommissioning activities and provide project management for several complex materials sites. The Regions also provide regulatory oversight for non-complex sites. DUWP will typically have responsibility for managing complex materials decommissioning projects that require site-specific dose modeling evaluations, have contaminated groundwater, or are requesting release in accordance with 10 C.F.R. 20.1403 or 20.1404. These sites are categorized in "NMSS Consolidated Decommissioning Guidance," NUREG-1757 (Rev 1., Volume 1, Table 1.2) as "Group 4-7" sites, and the regulatory features of these sites are summarized in Table 1.2 (non-complex) of NUREG-1757. The Regional offices will typically retain regulatory oversight responsibility for the sites described in Groups 1 and 2 of Table 1.2. Sites described in Group 3 can be managed by either DUWP or the Regions. Before assigning regulatory oversight responsibility to a Group 3 site, the Regions and DUWP will discuss and agree upon the appropriate lead office for the project.

The NRC's Office of Research provides information and analytical tools to NMSS, including tools to evaluate complex situations involving site contamination, that support assessments of public exposure to environmental releases of radioactive material from site decommissioning.

The Office of the General Counsel provides legal guidance on decommissioning policy matters, while the Office of Public Affairs provides advice and support for the NRC's public outreach activities related to decommissioning.

Financial Assurance for Decommissioning

NRC regulations require licensees of nuclear power plants to submit reports—DFS reports—on the status of funds put aside to cover the cost of decommissioning their nuclear plants. These reports must be submitted every two years when not actively decommissioning, annually within 5 years of the planned shutdown, and annually once the plant ceases operation.[28] Licensees must submit these reports by March 31 for the preceding reporting calendar year. The reports must provide specified information that will allow the agency to monitor the status of decommissioning funds for all power reactor licensees from the time they begin operating until their licenses are terminated.[29]

The NRC staff in the FAB independently analyzes each of these reports to determine whether the agency has reasonable assurance the licensees are providing sufficient funding for radiological decommissioning of each reactor when it is permanently shut down. This assurance is referred to as "decommissioning funding assurance (DFA)."[30]

The total cost of decommissioning a reactor facility depends on many factors, including the timing and sequence of the various stages of the decommissioning program, type of reactor or facility, location of the facility, radioactive waste burial costs, and plans for spent fuel storage. A recent NRC estimate of the decommissioning cost for a nuclear power plant ranged between $300 and $400 million.[31]

For operating reactors, in accordance with 10 C.F.R. 50.75(f)(1), the DFS reports must include:

(1) the amount of decommissioning funds estimated to be required pursuant to 10 C.F.R. 50.75(b) and 10 C.F.R. 50.75(c);

(2) the amount of decommissioning funds accumulated to the end of the calendar year preceding the date of the report;

(3) a schedule of the annual amounts remaining to be collected;

(4) the assumptions used in regard to rates of escalation in decommissioning costs, rates of earnings on decommissioning funds, and rates of other factors used in funding projections;

(5) any contracts on which the licensee is relying;

(6) any modifications occurring to a licensee's current method of providing financial assurance since the last submitted report; and,

(7) any material changes to trust agreements.

Under 10 C.F.R. 50.75, the NRC also requires power reactor licensees to demonstrate reasonable assurance of funding for decommissioning. Specifically, 10 C.F.R. 50.75(b)(1) requires applicants and licensees to certify the amount of financial assurance for decommissioning, and 10 C.F.R. 50.75(c) states the minimum amounts of funds for

[28] https://www.nrc.gov/waste/decommissioning/finan-assur.html
[29] *See* 10 C.F.R. 50.75(f)(1) and 50.75(f)(2) (for operating power reactors) and 10 C.F.R. 50.82(a)(8)(v) (for power reactors in decommissioning).
[30] https://www.nrc.gov/waste/decommissioning/finan-assur/bi-decom-reports.html
[31] https://www.nrc.gov/reading-rm/doc-collections/fact-sheets/decommissioning.html

decommissioning by reactor type. Adjustments to the certification amount are required annually over the operating life of the facility to account for escalation in the labor, energy, and waste burial components of decommissioning costs.

For power reactors in decommissioning, in accordance with 10 C.F.R. 50.82(a)(8)(v), the annual DFS reports must include:

(1) the amount spent on decommissioning, both cumulatively and over the previous calendar year, the remaining balance of any decommissioning funds, and the amount provided by other financial assurance methods being relied upon;

(2) an estimate of the costs to complete decommissioning, reflecting any difference between actual and estimated costs for work performed during the year, and the decommissioning criteria upon which the estimate is based;

(3) any modifications occurring to a licensee's current method of providing financial assurance since the last submitted report; and,

(4) any material changes to trust agreements or financial assurance contracts.

Pursuant to 10 C.F.R. 50.82(a)(8)(vi), if the sum of the balance of any remaining decommissioning funds, earnings on such funds calculated at not greater than a 2 percent real rate of return, and the amount provided by other financial assurance methods being relied upon does not cover the estimated cost to complete the decommissioning, the DFS report must include additional financial assurance to cover the estimated cost of completion.

Additionally, in accordance with 10 C.F.R. 50.82(c), for licensees that shut down their reactors prematurely, the collection period for any shortfall of funds will be determined on a case-by-case basis upon application by the licensee, taking into account the specific financial situation of each licensee.

According to the *Summary of Staff Biennial Review and Findings of the 2023 Decommissioning Funding Status Reports from Operating and Decommissioning Power Reactor Licensees*, based on the NRC's review of the 2023 DFS reports, the NRC staff found that all licensees are in compliance with the DFA reporting requirements of 10 C.F.R. 50.75(f)(1) and (2) for operating power reactor licensees and 10 C.F.R. 50.82(a)(8)(v) and (vi) for power reactor licensees in decommissioning. The staff also found that all licensees are in compliance with the decommissioning funding assurance requirements of 10 C.F.R. 50.75 and 10 C.F.R. 50.82, as applicable, for the 2023 DFS reporting cycle.[32]

[32] https://www.nrc.gov/docs/ML23304A230.pdf

Decommissioning Power Reactor Inspection Program

The Decommissioning Power Reactor Inspection Program follows NRC Inspection Manual Chapter 2561.[33] The goals of the oversight program at nuclear plants undergoing decommissioning are to:

- determine, through direct observation and verification, if decommissioning activities are being conducted safely, if the spent nuclear fuel is being stored safely, and if activities at a site are being conducted in accordance with all applicable regulations and commitments;
- determine if the administrative controls that a licensee has in place are adequate and comply with regulatory requirements, (the controls include self-assessment, audits and corrective actions, design control, safety review, maintenance and surveillance, radiation protection, and effluent controls); and,
- identify any significant declining performance trends and verify that a licensee has taken actions to reverse any trend.

The NRC oversees decommissioning of nuclear reactors through inspections that emphasize radiological controls, management, procedures compliance, spent fuel pool operations, and the safety review program. Many activities that occur during decommissioning are very routine and occur frequently in operating plants. These include decontamination of surfaces and components, surveys for radioactive contamination, waste packaging and disposal, and other activities. The inspection effort at plants being decommissioned is significantly less than at operating reactor sites. Rather than maintaining a continual presence, inspectors at sites being decommissioned will be provided to cover specific activities occurring at those sites.[34]

Summary of Oversight Performed on the Detailed Expenditures

Based on our discussions with members of the FAB, DUWP, and inspectors in Regions I and III, as well as our review of the Annual and Biennial DFS reports, we determined that the NRC is consistently monitoring the availability of funds in the DTFs.

During our interviews, we inquired as to the level of specificity used by the FAB in their reviews and whether they performed any analysis or examination of the detailed expenditures that supported the totals that each licensee reported on their DFS. Specifically, we inquired as to whether general ledgers or other detailed expenditure listings were requested and reviewed. We also inquired as to whether the audited financial statements from each trust fund were requested, reviewed, or reconciled to the amounts reported on the DFS. The FAB personnel noted that oversight or analysis at those levels of documentation was *not* performed.

When we met with inspectors from Regions I and III, we also inquired as to the level of detail for their analyses during site inspections. They explained that they conduct their inspection in accordance with Inspection Procedure 71801, which requires them to ask

[33] https://www.nrc.gov/docs/ML20358A131.pdf
[34] nrc.gov/waste/decommissioning/oversight.html

certain questions (as detailed in the previous section) but does *not* require a detailed review of expenditures.

Recent Violations Noted

During our review of publicly available information, we noted that, in February 2024 alone, the NRC identified issues related to the misuse of the DTFs involving four separate sites. These instances of misuse were also mentioned by several inspectors when we interviewed them.

- At Palisades, an NRC inspection report stated the licensee misused $57,000 in decommissioning funds.[35]
- At Pilgrim, the NRC issued a notice of violation stating that the licensee improperly spent $84,000 from the ratepayer-funded trust.[36]
- At Oyster Creek, an NRC notice of violation stated that the licensee used $62,000 of DTF money for expenses that were not legitimate decommissioning activities.[37]
- At Indian Point, an NRC notice of violation stated that the licensee used $63,000 of DTF money for expenses that were not legitimate decommissioning activities.[38]

Even though NRC inspection procedures did not require the inspectors to conduct detailed reviews of licensee expenditures, the inspectors, who are not financial experts or auditors, were able to identify these apparent instances of misuse involving DTFs.

Risk Assessment

Risk Identification

As previously discussed, we developed a risk register during our initial analysis of publicly available information and interviews. We reviewed this register with relevant OIG staff and made adjustments based upon interviews and additional documentation we obtained. Our finalized risk register is as follows:

[35] NRC Inspection Report 05000255/2023004(DRSS) Holtec Decommissioning International, LLC, Palisades Nuclear Plant (ADAMS Accession No. ML24045A147)
[36] Holtec Decommissioning International, LLC - Pilgrim Nuclear Power Station - NRC Inspection Report Nos. 05000293/2023003 and 05000293/2023004 (ADAMS Accession No. ML24043A057)
[37] Holtec Decommissioning International, LLC, Oyster Creek Nuclear Generating Station – NRC Inspection Report 05000219/2023003 (ADAMS Accession No. ML24046A124)
[38] Holtec Decommissioning International, LLC, Indian Point Energy Center Units 1, 2, and 3 - NRC Inspection Report Nos. 05000003/2023004, 05000247/2023004, 05000286/2023004, and 07200051/2023004 and Notice of Violation (ADAMS Accession No. ML24017A236)

Risk ID	Risk Statement
1	DFS Reports Do Not Provide Visibility into Funds Spent.
2	Lack of Transparency from Licensees May Lead to Unallowable Uses of the DTFs.
3	Lack of Transparency from Licensees May Lead to Misappropriation of the DTFs.
4	Lack of Transparency from Licensees May Lead to Unreasonable Costs using DTFs.
5	Lack of Transparency into the Subcontractor Vetting and Licensee Procurement Processes Could Lead to Unqualified Selections or Unreasonable Costs.
6	Unqualified or Unapproved Subcontractors May Be Utilized in the Decommissioning Process.
7	Outdated Formula Estimates and Lack of Benchmarks Could Lead to Inadequate Budgeting of Decommissioning Funds.
8	Inadequate Budget Monitoring of Decommissioning Funds by the NRC.
9	Proposed Accelerated Decommissioning Schedules Could Lead to Unsafe Practices.
10	Inaccurate or Delayed Reporting of Decommissioning Funding Status (DFS).
11	Unqualified (Financially, not Safety or Nuclear Subject Matter Expert Related) Inspectors or Estimators Used by NRC.
12	Inadequate Financial Qualification Review by the NRC.
13	Improper Use of Funds Could Lead to Shortfalls in Available Funding for the Proper Decommissioning of Nuclear Facilities.
14	Shortfalls in Funding May Lead to Adverse Effects (both financial and safety) to the Community the Licensee Services.
15	Improper Scheduling Estimates as a result of Reduced Planning due to Unavailability of Funds Prior to Shutdown can Lead to Cost Overruns during Decommissioning.
16	Transition Costs Prior to Shutdown May Be Inappropriately Charged to DTF.
17	Regulatory Uncertainty – Unclear Regulations May Impact Timeliness and Effectiveness of Decommissioning Process.

Risk ID	Risk Statement
18	Inadequate License Termination Plans (LTP) or Unapproved Changes Made to LTP Procedures. 1. Inadequate Identification or Estimation of Remediation Efforts Required for Successful License Termination. 2. Over or Under Remediation as Decommissioning Progresses May Be Costly.
19	NRC Provides Inappropriate Exemptions for Use of DTF During Operations.
20	Improper Characterization by Licensee May Lead to Increased Costs.
21	Scarce Nuclear Safety Authority Resources May Lead to Inexperienced or Unqualified Vendors or Laborers across All Aspects of Decommissioning.
22	Use of Unqualified Dose Modeling Contractors for LTP May Cause Cost Overruns.
23	Underestimated Hazardous Materials Costs.
24	Compliance with The Endangered Species Act and the National Historical Preservation Act and Social Justice Creates Unforeseen Delays/Impacts.
25	Lack of Procedural Guidance for Reimbursement of Legitimate Decommissioning Expenditures.

Assessment Methodology

This assessment is intended to provide an evaluation of the use of DTFs for nuclear reactors to identify risks, with a particular focus on risks related to corruption, fraud, waste, abuse, and mismanagement. This assessment also identifies potential improvement opportunities for management consideration. The following sections outline the key concepts around risks employed for this assessment.

What Is Risk?

Risk refers to the likelihood an event or action will adversely affect an organization's ability to achieve its organizational objectives and execute its strategies successfully. Every organization has risk, and there are fundamental uncertainties common to all organizations. Managers are responsible for implementing management practices that effectively identify, assess, respond to, and report on risk. In the federal government, the responsibilities for managing risks are shared throughout an agency, from the highest levels of executive leadership to the service delivery staff executing federal programs.

Types of Risks

Addressing the various types of risks and the amount of risk exposure is the key to optimizing business processes, safeguarding data and information systems, and protecting stakeholders. The following two concepts are vital to protecting the organization, guiding risk controls, and informing risk management policies:

- Inherent Risk – is typically the level of risk in place to achieve an entity's objectives before actions are taken to alter the risk's impact or likelihood.
- Residual Risk – is the risk remaining after considering mitigating influence of the control environment/risk management techniques.

It is important to note that we did not conduct further testing or analysis outside of an inherent risk assessment. Therefore, we did not assess how the risks are currently or potentially mitigated.

How Are Risks Mitigated?

Risk mitigation is the process of planning and developing methods and options to reduce threats to program/project objectives. As defined in the GAO Green Book,[39] risks are mitigated by internal controls, comprising 17 principles that include the entire system of: (1) establishing the control environment; (2) assessing risk; (3) developing control activities and policies; (4) providing internal and external information and communication; and, (5) monitoring and follow-up. A control's mitigating influence is considered when determining the residual risks. The risk assessment process does not test or judge the effectiveness of internal controls.

Risks Evaluation

To conduct our risk evaluation, we collected, reviewed, and analyzed data and twenty (20) responses from the NRC, the OIG, and Crowe personnel to complete our risk register ratings. We applied quantitative and qualitative methods and determined the relative risk rankings to evaluate significant threats to the oversight and use of the DTFs. To accomplish this, we developed a risk assessment matrix to identify and capture the likelihood of each risk and evaluated potential impacts or interruptions. We discussed each potential risk based on the impact and likelihood of specific events occurring. It is important to note that results represent an inherent risk rating and do not take into account any review or testing of internal controls. We assigned the level of risk based on the impact and likelihood ratings, resulting in an overall risk level of Insignificant, Low, Moderate, Elevated, or High. Risk levels are defined in Table 1.

[39] https://www.gao.gov/assets/gao-14-704g.pdf

Table 1

Risk Level				
Insignificant	**Low**	**Moderate**	**Elevated**	**High**
Risk exposure is lower than targeted levels. Undesirable outcomes are remote. Risk response may include an evaluation of the opportunity to take on additional risk. Continue monitoring through ongoing management activities, separate evaluations, or both.	Risk exposure is generally in line with targeted or expected levels. Undesirable outcomes are remote. Risk response is planned for in the normal course of business. Continue monitoring through ongoing management activities, separate evaluations, or both.	Risk exposure is generally in line with targeted or expected levels. Undesirable outcomes are unlikely. Risk response is planned for in the normal course of business. Continue monitoring through ongoing management activities, separate evaluations, or both.	Risk exposure is higher than targets and levels are approaching or at tolerance. Undesirable outcomes are possible. Additional risk response above that planned is required.	Risk exposure has exceeded levels willing to be tolerated. Undesirable outcomes are likely. Emergency response measures should be considered or may be required.

Based on our risk evaluation, we identified nineteen (19) risk observations we categorized as **Moderate (2.5 or higher)** (i.e., risks that require management attention). We also noted six (6) risks rated as Low (Less than 2.5) (presented in Appendix A).

Risk Assessment Matrix

		Potential Impact				
		Negligible (1)	**Minor (2)**	**Moderate (3)**	**Significant (4)**	**Major (5)**
Likelihood	**Almost Certain (5)**	**Low**	**Moderate**	**Elevated**	**High**	**High**
	Likely (4)	**Low**	**Low**	**Moderate**	**Elevated**	**High**
	Possible (3)	**Low**	**Low**	**Moderate**	**Elevated**	**Elevated**
	Unlikely (2)	**Insignificant**	**Low**	**Low**	**Moderate**	**Moderate**
	Rare (1)	**Insignificant**	**Insignificant**	**Low**	**Moderate**	**Moderate**

Likelihood of Risk Events Defined	
1. **Rare:** Reasonable assumption that this risk will not occur. 2. **Unlikely:** Reasonable assumption that this risk will likely not occur. 3. **Possible:** Reasonable assumption that this risk may occur.	4. **Likely:** Reasonable assumption that this risk will likely occur. 5. **Almost Certain:** Reasonable assumption that this risk will occur.

Potential Impact of Risk Events Defined	
1. **Negligible:** Unlikely to cause the activity to fail to meet part of its objectives. 2. **Minor:** May cause a failure to meet part of the objectives, which may expose the NRC to some non-compliance with laws and regulations, waste of resources, etc. 3. **Moderate:** May cause a failure to meet a significant part of the objectives, which may expose the NRC to non-compliance with laws and regulations, sizable waste of resources, etc.	4. **Significant:** May cause a failure to meet a significant part of the objectives, or negatively impact the objectives of other activities, which may expose the NRC to non-compliance with laws and regulations, sizable waste of resources, etc. 5. **Major:** Will cause a failure of the business process to meet the objectives, or cause objective failure in other activities, which may cause or expose the NRC to comply with laws and regulations, major waste of resources, failure to achieve stated goals, etc.

Observations

Developing and maintaining a risk management profile will provide a thoughtful analysis of the risks the NRC faces while achieving its strategic objectives and operations related to the decommissioning process. The profile will help identify appropriate options for addressing significant risks. Additionally, maintaining one will:

- Identify sources of uncertainty, both positive (opportunities) and negative (threats);
- Identify and gather higher-level, portfolio-level risks facing the decommissioning of nuclear reactor sites and the use of the trust funds; and,
- Identify potential improvement opportunities for management consideration.

As a result of our assessment, we identified the top six (6) risks, three of which rated 3.0 or above in the aggregate, and three of which rated just below 3.0 in the aggregate at 2.9, and all of which are categorized as Moderate (i.e., risks that require management attention). Of these six risks, five (Nos. 1, 3, 4, 5, and 6, below) relate to the NRC's oversight of DTF use by licensees, and the sixth (No. 2, below) relates to the impact of the scarcity of a skilled labor pool on decommissioning. We discuss these six risks in greater detail below.

Risk Observation 1
DFS Reports Do Not Provide Visibility into Funds Spent.

For power reactors in decommissioning, in accordance with 10 C.F.R. 50.82(a)(8)(v), the annual DFS reports must include: (1) the amount spent on decommissioning, both cumulatively and over the previous calendar year, the remaining balance of any decommissioning funds, and the amount provided by other financial assurance methods being relied upon; (2) an estimate of the costs to complete decommissioning, reflecting any difference between actual and estimated costs for work performed during the year, and the decommissioning criteria upon which the estimate is based; (3) any modifications occurring to a licensee's current method of providing financial assurance since the last submitted report; and, (4) any material changes to trust agreements or financial assurance contracts. The risk arises because the amounts reported are at a summary level. Licensees do not provide general ledgers or other detailed information to support the amounts listed on the DFS reports. The FAB is not required to request additional information in support of the amounts listed on the DFS reports, nor has it historically done so. Reconciliations are not performed between the amounts reported by licensees and the amounts reported by trustees in audited financial statements. Unless an NRC inspector requests additional information during an inspection, detailed information is not being reviewed.

Risk Level: Moderate

Risk Observation 2
Scarce Nuclear Safety Authority Resources May Lead to Inexperienced or Unqualified Vendors or Laborers across All Aspects of Decommissioning.

The decommissioning of nuclear sites requires specialized competencies and skillsets that may not be readily available in the market. Having qualified staff is essential to completing the decommissioning process in a safe, timely, and effective manner. As evidenced by the higher rating from our interviewees and the discussions held at the January 2024 Nuclear Energy Institute Decommissioning Conference, the pool of radiation protection personnel is already insufficient, which results in increasing competition between private industry and public sectors seeking these highly skilled professionals. The lack of available skilled workers to complete the decommissioning process could lead to increased costs due to a lack of competition or delays and extended timelines to complete the decommissioning process in an efficient manner.

We also noted a related risk that unqualified or unapproved subcontractors may be utilized in the decommissioning process resulting from the scarcity of personnel available to complete the process, possibly leading to overbilling for goods and services. Additionally, if unqualified or unapproved subcontractors are used for the decommissioning of nuclear sites, those costs could be deemed to be unallowable as DTF expenditures.

Risk Level: Moderate

Risk Observation 3
Lack of Transparency from Licensees May Lead to Unallowable Uses of the DTFs.

As described in the background section of this report and in Risk Observation 1, there is a lack of detailed expenditure information available for NRC review. This lack of transparency contributes to an increased risk that funds may be used for unallowable expenses. Recently, four instances of inappropriate use have been identified by inspectors during their high-level reviews of financial information during inspections. We noted an additional risk that did not rise to the moderate level related to NRC inspectors performing financial reviews, as most inspectors do not have a financial, accounting, or forensic background. They are trained and qualified as nuclear subject-matter experts—not as auditors or financial experts—which increases the risk that untrained eyes may not identify financial misuses.

Risk Level: Moderate

Risk Observation 4
Improper Use of Funds Could Lead to Shortfalls in Available Funding for the Proper Decommissioning of Nuclear Facilities.

An overarching risk related specifically to the oversight of licensee financial information exists that could lead to shortfalls in funding. During the interviews we conducted, NRC

staff members identified a lack of clear guidance or procedural documentation for the use and reimbursement of DTFs. The improper use of funds could lead to shortfalls in available funding for the proper decommissioning of nuclear facilities. If funds are not available to a licensee to safely decommission a nuclear site, adverse effects (both financial and safety) to the public may arise. This risk is more directly tied to how the funds are being used by licensees and not the oversight being performed by the NRC. However, with proper internal controls and additional oversight, the level of that risk could be significantly reduced.

The NRC does not require licensees to provide information regarding the procurement methods for goods and services related to decommissioning. Without visibility into detailed transactions or a review of what makes up those transactions, the NRC could be unable to determine whether licensees might be paying unreasonable amounts for the services, equipment, or materials required to successfully decommission nuclear sites in a safe manner.

Risk Level: Moderate

Risk Observation 5
Lack of Transparency from Licensees May Lead to Misappropriation of the DTFs.

This risk observation is similar to Risk Observation 3. Transaction level details are not readily available for review. Licensees can request funds from trustees either in advance or for reimbursement based on past expenses. While the FAB monitors whether an appropriate amount of funding is available to complete decommissioning, the FAB does not routinely verify whether licensee requests for trust fund disbursements are to be used specifically for decommissioning purposes. We identified an additional related risk that transition costs prior to shutdown may be inappropriately charged to the DTF. Licensees may be requesting reimbursement for expenses that occurred outside of the allowable time periods or for activities not specifically related to decommissioning of sites, leading to the elevated risk level.

Risk Level: Moderate

Risk Observation 6
Inadequate Budget Monitoring of Decommissioning Funds by the NRC.

We interviewed FAB personnel to identify the level of detail included in their reviews of DFS reports. The FAB performs an annual review of the amounts each licensee has spent to date on decommissioning activities, as well as the remaining funds available, to determine if a decommissioning funding shortfall is likely to occur. The FAB does not, however, perform in-depth analyses on the details of the amounts spent to date. While site inspectors can access detailed expenditure information during their inspections, the DFS reports reviewed by the FAB do not contain transaction-level details. Additionally, the FAB does not request or perform a detailed review of licensee financial records.

An important aspect of this risk assessment focused on the inherent risk in place for the potential events. This means that we looked at the risk—inadequate review of licensee financial information (budget monitoring)—if no controls or mitigating efforts were put in place. Without those controls, the identified risk could result in decommissioning funding shortfalls. Shortfalls in funding carry the possibility that the health and wellbeing of the public could be affected, and that additional financial burdens could fall upon ratepayers or other members of the public.

Risk Level: Moderate

Appendix A

As detailed in the assessment methodology section, we had twenty individuals from the NRC, the OIG, and Crowe who have prior experience with the decommissioning process and trust funds conduct a risk rating exercise on the risks identified in the risk register. Each risk was rated from 1–5 on both the potential impact if the risk event were to occur and the likelihood that the risk event were to occur. We then averaged out each of those scores to come to our final risk rating. The table below details the overall risk rating as well as the average scores for impact and likelihood.

Risk Statement	Impact	Likelihood	Rating
DFS Reports Do Not Provide Visibility into Funds Spent.	2.6	3.6	3.1
Scarce Nuclear Safety Authority Resources May Lead to Inexperienced or Unqualified Vendors or Laborers across All Aspects of Decommissioning.	3.1	3.0	3.0
Lack of Transparency from Licensees May Lead to Unallowable Uses of the DTFs.	2.8	3.1	3.0
Improper Use of Funds Could Lead to Shortfalls in Available Funding for the Proper Decommissioning of Nuclear Facilities.	3.6	2.3	2.9
Lack of Transparency from Licensees May Lead to Misappropriation of the DTFs.	3.0	2.8	2.9
Inadequate Budget Monitoring of Decommissioning Funds by the NRC.	3.1	2.7	2.9
Lack of Transparency from Licensees May Lead to Unreasonable Costs using Decommissioning Trust Funds.	2.8	2.9	2.8
Improper Characterization by Licensee May Lead to Increased Costs.	2.7	2.9	2.8
Proposed Accelerated Decommissioning Schedules Could Lead to Unsafe Practices.	3.2	2.3	2.8
Inadequate Financial Qualification Review by the NRC.	3.0	2.5	2.7

Risk Statement	Impact	Likelihood	Rating
Lack of Procedural Guidance for Reimbursement of Legitimate Decommissioning Expenditures.	2.6	2.8	2.7
Regulatory Uncertainty – Unclear Regulations May Impact Timeliness and Effectiveness of Decommissioning Process.	2.8	2.6	2.7
Inadequate LTPs or Unapproved Changes made to LTP Procedures. 1. Inadequate Identification or Estimation of Remediation Efforts Required for Successful License Termination. 2. Over or Under Remediation as Decommissioning Progresses May Be Costly.	2.9	2.4	2.7
Lack of Transparency into the Subcontractor Vetting and Licensee Procurement Processes Could Lead to Unqualified Selections or Unreasonable Costs.	2.6	2.7	2.6
Shortfalls in Funding May Lead to Adverse Effects (both Financial and Safety) to the Community the Licensee Services.	3.3	2.0	2.6
Outdated Formula Estimates and Lack of Benchmarks Could Lead to Inadequate Budgeting of Decommissioning Funds.	2.8	2.4	2.6
Unqualified or Unapproved Subcontractors May be Utilized in the Decommissioning Process.	2.8	2.4	2.6
Transition Costs Prior to Shutdown May be Inappropriately Charged to DTF.	2.4	2.8	2.6
Underestimated Hazardous Materials Costs.	2.5	2.5	2.5
Use of Unqualified Dose Modeling Contractors for LTP May Cause Cost Overruns.	2.3	2.5	2.4
Unqualified Inspectors or Estimators used by NRC.	2.7	2.1	2.4
Compliance with The Endangered Species Act and the National Historical Preservation Act and Social Justice Creates Unforeseen Delays/Impacts.	2.3	2.5	2.4
Inaccurate or Delayed Reporting of Decommissioning Funding Status (DFS).	2.2	2.3	2.2
Improper Scheduling Estimates as a Result of Reduced Planning due to Unavailability of Funds Prior to Shutdown Can Lead to Cost Overruns during Decommissioning.	2.4	2.0	2.2
NRC Provides Inappropriate Exemptions for Use of DTF During Operations.	2.4	1.8	2.1